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Notes

Notes:
1. Untranslatable words are replaced with asterisks (* * * * *).
2. Texts in the figures are not transcribed and shown as it is.

Translated: 23:34:21 IST June 2011

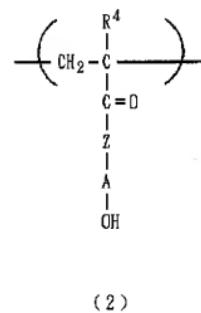
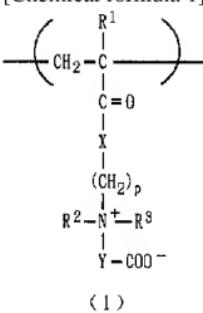
Dictionary - Last updated 10/14/2009 / Priority: 1. Chemistry / 2. Mechanical engineering / 3. Technical terms

FULL CONTENTS

[Claim(s)]

[Claim 1]A hydrophilic polymer whose weight average molecular weights it consists of a structural unit denoted by structural unit denoted by a general formula (1), and a general formula (2), and are 500-500,000.

[Chemical formula 1]



[R¹ and R⁴ show a hydrogen atom or a methyl group among a formula, respectively, X and Z show -NH- or -O-, respectively, and R² and R³ show an alkyl group of the carbon numbers 1-10 which a hydroxyl group may substitute, respectively, Y shows a divalent saturated hydrocarbon group of the carbon numbers 1-10 which a hydroxyl group may substitute, p shows the number of 2-5, and A shows an alkylene group of the carbon numbers 2-4.]

[Claim 2] The hydrophilic polymer according to claim 1 whose weight composition ratios of a structural unit (1) and a structural unit (2) are 10:90, 90:10.

[Claim 3] A moisturizer containing the hydrophilic polymer according to claim 1 or 2.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Even if this invention is excellent in moisturization ability and the effect depends

it on sweat or water, after washing away, it continues for a long time, and it relates to the moisturizer in which a using feeling moreover contains a good hydrophilic polymer and this.

「0002」

[Description of the Prior Art] Various moisturizers are blended with many of cosmetics or detergent compositions in order to give conventionally the feel gently used as hair or the skin. As this moisturizer, the alkylene oxide addition product of glycerol, propylene glycol, urea, and saccharides, etc. are used.

[0003]

[Problem to be solved by the invention] However, no these moisturizers were necessarily satisfactory in respect of moistness, a feel, etc., and also had easily diffusion and the problem that it flowed out and the effect did not continue, with sweat or water. In cosmetics flushed and used, such as rinse and body rinse, and the cleaning agent containing many surface active agents, the most will be flushed and an original effect cannot fully be demonstrated in many cases.

[0004]Therefore, even if it has outstanding moistness, a feel, etc. and was moreover based on sweat or water, and also after washing away, development of the moisturizer which a moisturizing effect maintains over a long time was desired.

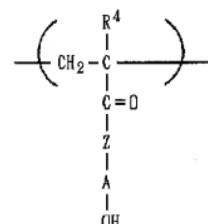
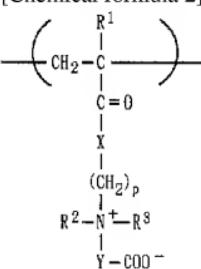
「0005」

[Means for solving problem] In this actual condition, this invention persons show the outstanding moistness, when the polymer which has a specific structural unit blends with various cosmetics or a detergent composition and uses it for skin, as a result of inquiring wholeheartedly, and. The effect continued over the long time, and also it found out that a feel was also good, and this invention was completed.

[0006]That is, this invention consists of a structural unit denoted by the structural unit denoted by a general formula (1), and a general formula (2), and a weight average molecular weight provides the moisturizer containing the hydrophilic polymer and this which are 500-500,000.

[0007]

[Chemical formula 2]



(1)

(2)

[0008][R¹ and R⁴ show a hydrogen atom or a methyl group among a formula, respectively, X and Z show -NH- or -O-, respectively, and R² and R³ show the alkyl group of the carbon numbers 1-10 which the hydroxyl group may substitute, respectively, Y shows the divalent saturated hydrocarbon group of the carbon numbers 1-10 which the hydroxyl group may substitute, p shows the number of 2-5, and A shows the alkylene group of the carbon numbers 2-4.]

[0009]

[Mode for carrying out the invention][as an alkyl group of the carbon numbers 1-10 which the hydroxyl group shown by R² and R³ among a general formula (1) may substitute] A methyl group, an ethyl group, a propyl group, a butyl group, a pentyl group, a hexyl group, a heptyl group, an octyl group, a nonyl group, a decyl group, a hydroxyethyl group, etc. are mentioned, and a methyl group, an ethyl group, and a hydroxyethyl group are especially preferred. [as a divalent saturated hydrocarbon group of the carbon numbers 1-10 which the hydroxyl group shown by Y may substitute] Including both a methylene group an alkylene group and an alkylidene group, for example, a methylene group, Ethylene, a trimethylene group, a propylene group, a tetramethylen group, a pentamethylene group, A hexamethylene group, a heptamethylene group, an octamethylene group, a nonamethylene group, a decamethylene group, hydroxy ethylene, a 2-hydroxy ethylidene group, etc. are mentioned, and especially a methylene group and ethylene are preferred. Especially 3 is preferred although p shows the number of 2-5. Among a general formula (2), as an alkylene group of the carbon numbers 2-4 shown by A, ethylene, a trimethylene group, a propylene group, a tetramethylen group, etc. are mentioned, and especially ethylene is preferred.

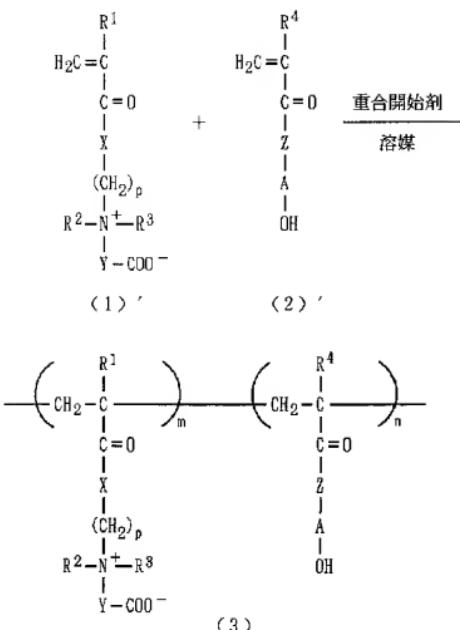
[0010]Although the weight composition ratio in particular of a structural unit (1) and a structural unit (2) contained in the hydrophilic polymerization inside of the body of this invention is not limited, 10:90-90:10, and the thing in especially the range of 20:80-80:20 have high moisturization ability, and moreover the feel of a thing is also good, and they are preferred. Both a block copolymer a random copolymer an alternating copolymer, etc. are contained in the hydrophilic polymer of this invention.

[0011]As for the hydrophilic polymer of this invention, although weight average molecular weights need to be 500-500,000, it is preferred that it is 1,000-200,000 in respect of moisturization ability and a feel.

[0012]The hydrophilic polymer of this invention can be manufactured, for example according to the following reaction formula.

[0013]

[Chemical formula 3]



[0014] [R¹, R², R³, R⁴, X, Y, Z, A, and p show the same meaning as the above among a formula, and m and n show the arbitrary positive numbers with which a weight average molecular weight is set to 500-500,000.]

[0015] That is, this invention polymer which has the structure denoted by a general formula (3) can be obtained by copolymerizing the monomer denoted by general formula (1)' and (2)' under existence of a polymerization solvent using a radical polymerization initiator.

[0016] Monomer (1)' used for this reaction can be manufactured, for example in accordance with the method of a description to JP,H6-257348,A etc., and monomer (2)' can be manufactured, for example in accordance with the method of a description to JP,H4-305860,A, JP,S59-190280,A, etc. As a polymerization solvent used for copolymerization, polar solvents, such as water, methanol, ethanol, and dimethylformamide, are preferred, and especially water is preferred. As a radical polymerization initiator, commercial items, such as an azo radical initiator (made by Wako Pure Chem), for example, V-50 etc., can be used. As for especially a polymerization reaction, it is preferred to carry out at 40-80 ** 30-100 ***.

[0017] When it applies to the skin or hair, it continues over a long time, without excelling in moisturization ability and the effect being affected by the influence of sweat, water, etc., and moreover the hydrophilic polymer of a feel of this invention obtained in this way is good, and useful as a moisturizer of various cosmetics or a detergent composition.

[0018]

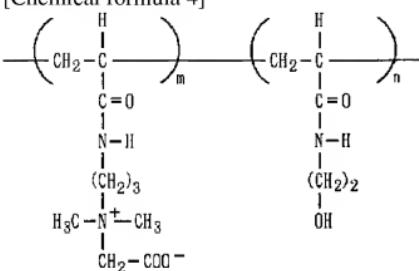
[Working example] Next, although an embodiment is given and this invention is explained further, this

invention is not limited to these embodiments.

[0019]N-(3-acrylamide propyl)-N-carboxymethyl N and N-dimethylammonium hydroxide salt 10.72g after carrying out nitrogen substitution of the separable flask provided with embodiment 1 cooling pipe, The N-(2-hydroxyethyl) acrylamide 5g, V-50 (made by Wako Pure Chem) 0.1327g, and the water 140g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and the precipitate was separated. After dissolving the separated precipitate in water and giving lyophilization, 13.3 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0020]

[Chemical formula 4]



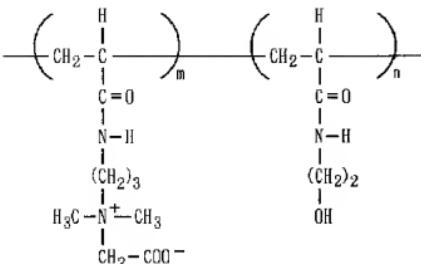
[0021]NMR. (200 MHz, D₂O, ppm) :1.1-1.67. (4H, m, -CH₂-CH-x2) 1.67-2.0. (4H, m, -CH₂-CH₂-x2, -NH-CH₂-CH₂-N(CH₃)₂) 2.9-3.28 (-NH-CH₂-CH₂-CH₂-N 10H, m) (CH₃)₂, -CH₂-CH₂-OH 3.41-3.6 (4H, m, and -NH-CH₂-CH₂-CH₂-N(CH₃)₂, -CH₂-CH₂-OH) 3.74. (2H, s, and -N(CH₃)₂-CH₂-COO⁻)

molecular weight (GPC, 0.2M phosphoric acid buffer, PEG conversion): -- Mw=70,000 and Mn=50,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =62.1wt%/37.9wt%

[0022]N-(3-acrylamide propyl)-N-carboxymethyl N and N-dimethylammonium hydroxide salt 3.45g after carrying out nitrogen substitution of the separable flask provided with embodiment 2 cooling pipe, The N-(2-hydroxyethyl) acrylamide 11.55g, V-50 (made by Wako Pure Chem) 0.1237g, and the water 140g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and the precipitate was separated. After dissolving the separated precipitate in water and giving lyophilization, 12.8 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0023]

[Chemical formula 5]

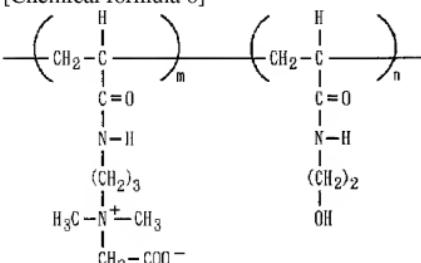


[0024]NMR. (200 MHz, D₂O, ppm) :1.1-1.67. (4H, m, -CH₂-CH-x2) 1.67-2.0. (4H, m, -CH₂-CH-x2, -NH-CH₂-CH₂-CH₂-N(CH₃)₂) 2.9-3.28 (-NH-CH₂-CH₂-CH₂-N 10H, m) (CH₃)₂, -CH₂-CH₂-OH 3.41-3.6 (4H, m, and -NH-CH₂-CH₂-CH₂-N(CH₃)₂, -CH₂-CH₂-OH) 3.74. (2H, s, and -N(CH₃)₂-CH₂-COO⁻) molecular weight (GPC, 0.2M phosphoric acid buffer, PEG conversion): -- Mw=50,000 and Mn=35,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =20.7wt%/79.3wt%

[0025]N-(3-acrylamide propyl)-N-carboxymethyl N and N-dimethylammonium hydroxide salt 13.5g after carrying out nitrogen substitution of the separable flask provided with embodiment 3 cooling pipe, The N-(2-hydroxyethyl) acrylamide 1.52g, V-50 (made by Wako Pure Chem) 0.074g, and the water 140g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and the precipitate was separated. After dissolving the separated precipitate in water and giving lyophilization, 16.2 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0026]

[Chemical formula 6]

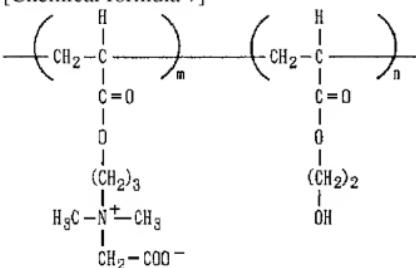


[0027]NMR. (200 MHz, D₂O, ppm) :1.1-1.67. (4H, m, -CH₂-CH-x2) 1.67-2.0. (4H, m, -CH₂-CH-x2, -NH-CH₂-CH₂-CH₂-N(CH₃)₂) 2.9-3.28 (-NH-CH₂-CH₂-CH₂-N 10H, m) (CH₃)₂, -CH₂-CH₂-OH 3.41-3.6 (4H, m, and -NH-CH₂-CH₂-CH₂-N(CH₃)₂, -CH₂-CH₂-OH) 3.74. (2H, s, and -N(CH₃)₂-CH₂-COO⁻) molecular weight (GPC, 0.2M phosphoric acid buffer, PEG conversion): -- Mw=90,000 and Mn=80,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =85.5wt%/14.5wt%

[0028]N-(3-acryloyl propyl)-N-carboxymethyl N and N-dimethylanmonium hydroxide salt 10.76g after carrying out nitrogen substitution of the separable flask provided with embodiment 4 cooling pipe, The N-(2-hydroxyethyl) acrylamide 5g, V-50 (made by Wako Pure Chem) 0.1327g, and the water 140g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and the precipitate was separated. After dissolving the separated precipitate in water and giving lyophilization, 13.5 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0029]

[Chemical formula 7]

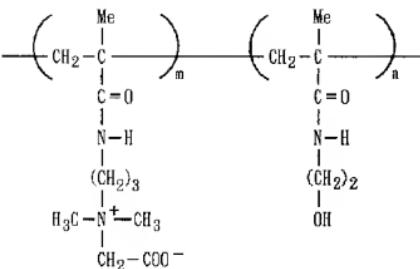


[0030]NMR. (200 MHz, D₂O, ppm) :1.1-1.67. (4H, m, -CH₂-CH₂x2) 1.67-2.0. (4H, m, -CH₂-CH₂-x2, -0-CH₂-CH₂-CH₂-N(CH₃)₂) 2.9-3.28 (10H, m, and -O-CH₂-CH₂-CH₂-N(CH₃)₂-) - CH₂-CH₂-OH 3.41-3.6. (4H, m, and -O-CH₂-CH₂-CH₂-N(CH₃)₂, -CH₂-CH₂-OH) 3.74 (2H, s, and -N(CH₃)₂-CH₂-COO⁻)

(-) molecular weight. (GPC, a 0.2M phosphoric acid buffer, PEG conversion) :Mw=75,000 and Mn=50,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =87wt%/13wt% [0031]N-(3-methacrylamide propyl)-N-carboxymethyl N and N-dimethylanmonium hydroxide salt 11.36g after carrying out nitrogen substitution of the separable flask provided with embodiment 5 cooling pipe, The N-(2-hydroxyethyl) acrylamide 5g, V-50 (made by Wako Pure Chem) 0.1327g, and the water 140g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and the precipitate was separated. After dissolving the separated precipitate in water and giving lyophilization, 14.5 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0032]

[Chemical formula 8]



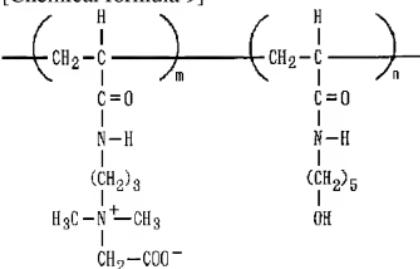
[0033]NMR. (200 MHz, D₂O, ppm) :1.1-1.67. (4H, m, and -CH₂-C(CH₃)-x2) 1.67-2.0 (8H, m, -CH₂-C(CH₃)-x2, -NH-CH₂-CH₂-CH₂-N(CH₃)₂⁻)

2.9-3.28. (10H, m, and -NH-CH₂-CH₂-CH₂-N(CH₃)₂⁻, -CH₂-CH₂-OH) 3.41-3.6 (-NH-CH₂-CH₂-CH₂-CH₂-N 4H, m) (CH₃)₂⁻ and -CH₂-CH₂-OH 3.74 (2H, s, and -N(CH₃)₂-CH₂-COO⁻) molecular weight

(GPC, 0.2M phosphoric acid buffer, PEG conversion):Mw=80,000. [Mn= 70,000 composition ratio] (NMR) : structural unit (1) / structural unit (2) =83.5wt%/16.5wt% [0034]N-(3-acrylamide propyl)-N-carboxymethyl N and N-dimethylammonium hydroxide salt 10g after carrying out nitrogen substitution of the separable flask provided with embodiment 6 cooling pipe, The N-(5-hydroxy pentyl) acrylamide 6g, V-50 (made by Wako Pure Chem) 0.089g, and the water 150g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and settling were separated. After dissolving the separated settling in water and giving lyophilization, 13.4 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0035]

[Chemical formula 9]

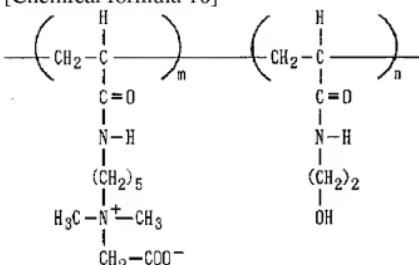


[0036]NMR. (200 MHz, D₂O, ppm) :1.1-1.67. (-CH₂-) [10H, m, -CH₂-CH-x2,] (CH₂)₃-CH₂-OH 1.67-2.0 (4H, m, -CH₂-CH-x2, -NH-CH₂-CH₂-CH₂-N(CH₃)₂⁻) 2.9-3.28 (10H and m.) - NH-CH₂-CH₂-CH₂-N(CH₃)₂⁻, -CH₂- (CH₂)₃-CH₂-OH 3.41-3.6 (4H, m, and -NH-CH₂-CH₂-CH₂-N(CH₃)₂⁻, -CH₂-(CH₂)

$\text{3-CH}_2\text{-OH}$ 3.74. (2H, s, and $-\text{N}(\text{CH}_3)_2\text{-CH}_2\text{-COO}^-$) molecular weight (GPC, 0.2M phosphoric acid buffer, PEG conversion): -- Mw=50,000 and Mn=30,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =65.2wt%/34.8wt% [0037]N-(5-acrylamide pentyl)-N-carboxymethyl N and N-dimethylammonium hydroxide salt 13.5g after carrying out nitrogen substitution of the separable flask provided with embodiment 7 cooling pipe, The N-(2-hydroxyethyl) acrylamide 5.63g, V-50 (made by Wako Pure Chem) 0.106g, and the water 120g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and settling were separated. After dissolving the separated precipitate in water and giving lyophilization, 1.34 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0038]

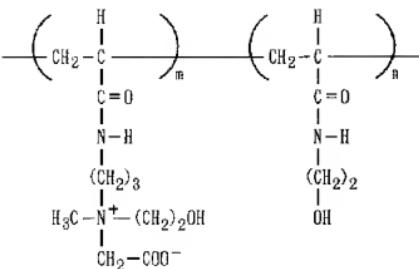
[Chemical formula 10]



[0039]NMR. (200 MHz, D_2O , ppm) :1.1-1.67. 10H, m, and $-\text{CH}_2\text{-CH-}x_2\text{. - NH-CH}_2\text{-}(\text{CH}_2)_3\text{-CH}_2\text{-N}(\text{CH}_3)_2$ -1.67-2.0. (4H, m, $-\text{CH}_2\text{-CH-}x_2\text{, - NH-CH}_2\text{-CH}_2\text{-CH}_2\text{-N}(\text{CH}_3)_2$) 2.9-3.28 (-NH-CH₂-(CH₂)₃-CH₂-N 10H, m) (CH_3)₂-, $-\text{CH}_2\text{-CH}_2\text{-OH}$ 3.41-3.6 (4H, m, $-\text{NH-CH}_2\text{-}(\text{CH}_2)_3\text{-CH}_2\text{-N}(\text{CH}_3)_2$, $-\text{CH}_2\text{-CH}_2\text{-OH}$) 3.74. (2H, s, and $-\text{N}(\text{CH}_3)_2\text{-CH}_2\text{-COO}^-$) molecular weight (GPC, 0.2M phosphoric acid buffer, PEG conversion): -- Mw=70,000 and Mn=50,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =55wt%/45wt% [0040]The N-(3-acrylamide propyl)-N-carboxymethyl N-methyl-N-hydroxyethyl ammonium hydroxide salt 10g after carrying out nitrogen substitution of the separable flask provided with embodiment 8 cooling pipe, The N-(2-hydroxyethyl) acrylamide 4.14g, V-50 (made by Wako Pure Chem) 0.008g, and the water 127g were added, temperature up was carried out to 50 **, and the reaction was performed for 9 hours. The polymerization solution was reprecipitated to 20-times the amount acetone after the end of a polymerization, and settling were separated. After dissolving the separated settling in water and giving lyophilization, 10 g of copolymers were obtained. It checked that it was a polymer which has the following structures as a result of NMR analysis.

[0041]

[Chemical formula 11]



[0042]NMR. (200 MHz, D₂O, ppm): 1.1-1.67. (4H, m, -CH₂-CH-x2) 1.67-2.0. (4H, m, -CH₂-CH₂-x2, -NH-CH₂-CH₂-CH₂-N(CH₃)₂) 2.9-3.28 (-NH-CH₂-CH₂-CH₂-N 12H, m) (CH₃)₂-, -CH₂-CH₂-OHx23.41-3.6 (6H, m, and -NH-CH₂-CH₂-CH₂-N(CH₃)₂-, -CH₂-CH₂-OHx2) 3.74. (2H, s, and -N(CH₃)₂-CH₂-COO⁻) molecular weight (GPC, 0.2M phosphoric acid buffer, PEG conversion): --

Mw=40,000 and Mn=30,000 -- composition ratio (NMR):structural unit (1) / structural unit (2) =59wt %/41wt% [0043]The moistness and feel were evaluated about each component shown in the example of examination 1 table 1. A result is shown in Table 1.

[0044]The 0.5% aqueous solution of <moistness> each sample is prepared, the sample solution of 10micropers 1 cm² l is applied to the human forearm flection which carried out the conditioning at 20 **/44% RH, and it is neglected for 10 minutes. SKICON-200 (made by IBS) was used before and after this treatment, epidermis conductance was measured, and that ratio "conductance before the conductance / treatment after treatment" was calculated as moisturization ability. The result of having repeated the above operation 10 times is shown as an average. It is a stream and the treatment part was rinsed, after wiping off water with a towel, it was neglected for 10 more minutes, and epidermis conductance was measured similarly, and "the conductance before a conductance / rinse after a rinse" was searched for as moisturization ability after a rinse.

[0045]The 5% potassium myristate aqueous solution containing 0.2% of <feel> each sample is prepared. After taking 2 ml of the solution in the palm and often whipping, it rinses with a stream and water is wiped off with a towel. The feel of the palm of about 5 minutes after was evaluated in accordance with the following basis.

x: gently -- admiration O: -- **: carried out gently -- x: carried out a little gently -- feeling of - stickiness O: which is not carried out gently -- it is not sticky -- a little more than [**:] -- it is not sticky - sticky

[0046]

[Table 1]

			保湿能	すすき 後の保 湿能	感 触	
					しっとり感	べたつき感
本発明品	1	実施例 1 の重合体	1. 5	1. 5	○	○
	2	実施例 2 の重合体	1. 6	1. 6	○	△
	3	実施例 3 の重合体	1. 4	1. 4	△	○
	4	実施例 4 の重合体	1. 4	1. 4	○	△
	5	実施例 5 の重合体	1. 3	1. 3	△	○
	6	実施例 6 の重合体	1. 3	1. 3	△	○
	7	実施例 7 の重合体	1. 3	1. 3	△	○
	8	実施例 8 の重合体	1. 6	1. 6	○	○
比 較 品	1	ブランク (水)	1. 0	1. 0	×	○
	2	グリセリン	1. 7	1. 2	△	△
	3	カチオン化セルロース ^{*1}	1. 3	1. 3	△	×

*1: ポイズC-60H (花王社製)

[0047]this invention article shows the outstanding moisturization ability, and moreover, also after it rinsing, it is held, and also this gives a good feel so that clearly from the result shown in Table 1.

[0048]

[Effect of the Invention]When it applies to the skin or hair, even if the hydrophilic polymer of this invention is excellent in moisturization ability and the effect twists it in sweat or water, after washing away, it continues over a long time, and moreover, it is good at the time of use, and useful as moisturizers, such as various cosmetics and a detergent composition. [of the feel after - use]

[Translation done.]